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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,343	03/06/2002	Hideki Ichioka	1035-369	7043

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EXAMINER	
CALEY, MICHAEL H	
ART UNIT	**PAPER NUMBER**
2882	

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/091,343	ICHIOKA ET AL.	
	Examiner	Art Unit	
	Michael H. Caley	2882	

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 7, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Takafumi (Japanese Patent Application Publication 05-165060).

Regarding claim 1, Takafumi discloses a liquid crystal display device having:

a switching element substrate having switching elements (Figure 1 elements 1 and 4, Abstract);

a counter substrate opposite to the switching element substrate (Figure 1 element 2, Abstract);

a liquid crystal layer formed between the substrates (Figure 1, Abstract);

a sealing section provided so as to enclose a display area between the substrates for sealing liquid crystal constituting the liquid crystal layer, the sealing section having conductive particles (Figure 1 elements 11 and 12, Abstract);

first signal wiring, provided on one of the substrates for controlling the switching elements (Figure 1, Abstract);

second signal wiring, provided on the other substrate so as to be opposite to the first signal wiring for applying a voltage to the liquid crystal layer (Figure 1, Abstract); and

at least one transfer section for electrically connecting the first signal wiring or the second signal wiring and the substrate opposite to the first signal wiring or the second signal wiring via the conductive particles (Figure 1, Abstract).

Regarding claim 2, Takafumi discloses an input terminal of the first signal wiring and an input terminal of the second signal wiring as provided on one of the substrates (Figure 6 elements 101, 104, and 107.

Regarding claims 3 and 4, Takafumi discloses a transfer section as proposed in which contact pads are provided on both substrates with connections to their respective wirings having electrical connections through the conductive particles (Figure 1, Translation Pages 3 and 4).

Regarding claims 7 and 8, Takafumi discloses a substrate (Figure 1 element 2) with an external connection to a signal generator which supplies the signal to the opposite substrate via the electroconductive seal member (Abstract).

Claims 1, 20, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Pitt (U.S. Patent No. 5,442,469).

Regarding claim 1, Pitt discloses a liquid crystal display device having:

a switching element substrate having switching elements (Figure 2 elements 6, 8, 16, and 17; Column 3 lines 50-57);

a counter substrate opposite to the switching element substrate (Figure 2 element 3);

a liquid crystal layer formed between the substrates (Figure 2 element 4);

a sealing section provided so as to enclose a display area between the substrates for sealing liquid crystal constituting the liquid crystal layer, the sealing section having conductive particles (Figure 2 element 21; Column 3 lines 60-67);

first signal wiring, provided on one of the substrates for controlling the switching elements (Figure 2 elements 6 and 8);

second signal wiring, provided on the other substrate so as to be opposite to the first signal wiring for applying a voltage to the liquid crystal layer (Figure 2 elements 7 and 11); and

at least one transfer section for electrically connecting the first signal wiring or the second signal wiring and the substrate opposite to the first signal wiring or the second signal wiring via the conductive particles (Column 3 lines 50-69, Column 4 lines 1-23; Figure 2 element 21).

Regarding claim 20, Pitt discloses the conductive particles as having elasticity (Column 3 lines 63-67).

Regarding claim 23, Pitt discloses the conductive particles as coated with a conductive material (Column 3 lines 63-67).

Claims 1-4, 14, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Burrell et al. (U.S. Patent No. 5,680,192 "Burrell").

Regarding claim 1, Burrell discloses a liquid crystal display device having:

a switching element substrate having switching elements (Column 4 lines 21-34; Figure 1);

a counter substrate opposite to the switching element substrate (Figure 2; Column 4 lines 39-40);

a liquid crystal layer formed between the substrates (Column 4 lines 45-48);

a sealing section provided so as to enclose a display area between the substrates for sealing liquid crystal constituting the liquid crystal layer, the sealing section having conductive particles (Column 1 lines 63-67, Column 2 lines 1-21, Column 3 lines 9-13, Column 4 lines 45-48);

first signal wiring, provided on one of the substrates for controlling the switching elements (Column 4 lines 48-60);

second signal wiring, provided on the other substrate so as to be opposite to the first signal wiring for applying a voltage to the liquid crystal layer (Column 4 lines 48-60); and

at least one transfer section for electrically connecting the first signal wiring or the second signal wiring and the substrate opposite to the first signal wiring or the second signal wiring via the conductive particles (Column 1 lines 63-67, Column 2 lines 1-21, Column 3 lines 9-13, Column 4 lines 45-48).

Regarding claim 2, Burrell discloses an input terminal of the fist signal wiring and an input terminal of the second signal wiring as provided on one of the substrates (Column 4 lines 61-67, Column 5 lines 1-14).

Regarding claims 3 and 4, Burrell discloses a transfer section as proposed in which contact pads are provided on both substrates with connections to their respective wirings having electrical connections through the conductive particles (Column 5 lines 15-24).

Regarding claims 14 and 15, the first substrate is the switching element substrate having the switching elements (Figure 2 elements 6, 8, 16, and 17; Column 3 lines 50-57).

Claim Rejections - 35 USC § 103

Claims 5, 6, 16, 17, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burrell.

Regarding claims 5 and 6, Burrell discloses all of the proposed limitations except for the first and second contact pads as having substantially the same resistance. Burrell, however, discloses an embodiment of the invention in which contact pads on both substrates connect via conductive spacer balls therebetween (Column 5 lines 15-24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the first and second contact pads such that they would have substantially the same resistance. The contact pads form a part of a conductive path between the first and second substrate. The contact pads are limited by a maximum resistance and a maximum amount of space that they may occupy in the substrate layout. One would have been motivated to construct the contact pads of both substrates in a substantially similar manner to

ensure a proper conductive connection with substantially equal resistances through each pad while maintaining equally small footprints of the pads on each substrate.

Regarding claims 16, 17, and 24, Burrell discloses the transfer section as provided along both edges of a width of the sealing section (Column 2 lines 22-30). Burrell fails to disclose the relative resistance between the input terminals and the signal wiring. Burrell, however, teaches a minimum area for the seal connector corresponding with a maximum allowed resistance (Column 5 lines 60-67, Column 6 lines 1-15; Column 7 lines 39-46). The Examiner takes Official notice that contacts such as pads typically have a larger cross-sectional area than a signal wiring section, giving the wiring section a higher resistance that that of the pad.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the pads and the wiring such that the input terminals had a lower resistance than that of the wiring. Such a design would have incorporated methodologies old and well known in the art of achieving a fault-free device having conducting and highly reliable connections. One would have been motivated to construct the pads and the wiring to such a specification to allow for the smallest possible implementation of the electrical connections while realizing a reliable and functional device.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burrell in view of Takafumi.

Burrell discloses all of the proposed limitations except for the transfer section as provided between the signal generation circuit and its corresponding wiring. Takafumi, however,

discloses a substrate (Figure 1 element 2) with an external connection to a signal generator which supplies the signal to the opposite substrate via the electroconductive seal member (Abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a signal from the generation circuit to the wiring on the opposite substrate of the input terminal via the transfer section in Burrell's device. Burrell discloses the input for both first and second wirings on a same substrate and the second wiring on the opposite substrate. Thus, it would have been necessary to provide the signal from the generation circuit to the second wiring via the transfer section. One would have been motivated to communicate the signal via the transfer section in order to achieve the wiring on separate substrates while having the input terminals on one substrate. Such a design would have been motivated by a desire to maximize the display viewing area as described by Burrell.

Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takafumi in view of Sakamoto et al. (U.S. Patent No. 6,366,331 "Sakamoto").

Takafumi discloses all of the proposed limitations except for the mean distribution volume of the conductive particles. Sakamoto, however, discloses a density of conductive particles within a conductive sealing member functioning as a transfer section for a liquid crystal display which fits within the proposed limitation (Column 7 lines 29-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have tailored the transfer section disclosed by Takafumi such that the distribution of conductive particles would fall within the proposed range. As is old and well known in the art the preferred density of the particles depends largely on the size of the particles within the

sealing medium. One would have been motivated to adjust the density of the particles to within the proposed range when using particles of a given size so that the optimal conductivity of the medium between plates may occur. Such a choice for the density would have been an engineering expediency to accommodate for the size of the particle used or available and the desired conductivity of the connection.

Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burrell in view of Pitt.

Regarding claims 18 and 19, Burrell discloses all of the claimed limitations except for the insulation film having an opening formed on at least one of the substrates with a contact pad provided in the opening. Pitt, however, teaches an insulating layer in a liquid crystal display embodiment with a conducting seal (Column 3 lines 19-21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included an insulating film on the substrate with an opening for the contact pad. Such insulating films are well known as having a space for electronics on the surface of the substrate. Thus it would have been necessary to provide a space for contact pads in the embodiment disclosed by Pitt. It would have been advantageous to include a such an insulating film as described by Pitt to Burrell's display device to eliminate unwanted noise and shorts in the device, improving its precision and reliability.

Regarding claim 20, Burrell fails to disclose the particles as constructed from an elastic material. Pitt, however, teaches constructing such particles from an elastic material (Column 3 lines 63-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the particles disclosed by Burrell as taught by Pitt. Such a construction material for the particles would have been an engineering expediency to accommodate the particles for a particularly sized or configured display.

Regarding claim 21, Burrell fails to disclose the diameter of the spacer balls as greater than a cell thickness of the sealing section. Burrell, however, teaches the use of the particles as both a conducting material and a spacing means.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the conductive particles with a diameter larger than the cell thickness of the sealing section. Depending on the type of particle used, especially for one constructed from an elastic-type material, it would have been appropriate to give the particle a larger diameter such that the particle would ensure an electrical connection between the substrates. Additionally, such a large, elastic particle would advantageously maintain a relative position between pads of the substrates due to its compressed condition.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pitt.

Pitt fails to explicitly detail a distance of 50 microns or more between the particle position and an interface between the liquid crystal layer and the sealing section. The Examiner takes Official notice, however, that applications involving a sealing member with conductive particles include such a distance as is mandatory for the proper functionality of the liquid crystal display.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the seal such that the particles would be at least 50 microns from the interface. Such a design constraint would have been necessary in order to avoid unwanted fields applied to the liquid crystal layer through the transfer section. One would have been motivated to maintain such a separation in Pitt's device in order to avoid unwanted effects to the liquid crystal from leakage through the transfer section.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael H. Caley whose telephone number is (703) 305-7913. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

mhc
May 28, 2003